

Psalm 19 starts with the statement

The heavens declare the glory of God and the firmament proclaims His handiwork.

Is this true?

ABSOLUTELY IT IS!!

Can science prove, or disprove, the existence of the Almighty? What do eminent scientists say about what their work illuminates?

To quote Albert Einstein-:

The scientist is possessed by the sense of universal causation. His religious feeling takes the form of rapturous amazement at the harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection.

It is beyond question closely akin to that which has possessed the religious geniuses of all ages.

The comments of Frank Tipler, Professor of Mathematical Physics at Tulane University, in the Preface of his book *The Physics of Immortality*, are instructive.

When I began my career as a cosmologist some twenty years ago, I was a convinced atheist. I never in my wildest dreams imagined that one day I would be writing a book purporting to show that the central claims of Judea- Christian theology are in fact true, that these claims are straight-forward deductions of the laws of physics as we now understand them. I have been forced into these conclusions by the inexorable logic of my own special branch of physics.

Professor Tipler is a major theoretician in the field of global general relativity, the rarefied branch of physics created by Stephen Hawking and Roger Penrose. Like most modern scientists, he was an atheist who gave little thought to questions of theology. Yet in devising a mathematical model of the end of the universe, Tipler came to a startling conclusion: using the most advanced and sophisticated methods of modern physics, he had created an argument for the existence of God and of universal resurrection.

Those who work in fundamental physics encounter a world whose large-scale structure (as described by cosmology) and small-scale process (as described by quantum theory) are alike characterised by a wonderful order that is expressible in concise and elegant mathematical terms.

Now, if I am worrying you with terms like the 'beauty' of mathematics, let me reassure you with

examples of this, in this environment. The church music we treasure, from our Director of Music and our choir, has scales of notes, octaves, etc., which form absolutely perfect mathematical relationships. It would be relatively easy to transcribe a Bach cantata into a mathematical format - but we don't because it is the innately human recognition of the beauty of these naturally occurring mathematical relationships we seek, not the relationships themselves.

Similarly, let us consider the case of the glorious colours of our church's stained-glass windows. All of these colours each have a mathematical signature. But those colours that 'go' together exhibit compatible mathematical features - which is exactly the case in creating musical chords. Harmonic relationships are mathematical constructs.

The distinguished theoretical physicist Paul Dirac, who was not a conventionally religious man, was once asked "*what was his fundamental belief?*" He strode to a blackboard and wrote that *the laws of nature should be expressed in beautiful equations*. It was a fitting affirmation by one whose fundamental discoveries had all come from his dedicated pursuit of mathematical beauty. This use of abstract mathematics as a technique of physical discovery points to a very deep fact about the nature of the universe that we inhabit, and to the remarkable conformity of our human minds to its patterning. We live in a world whose physical fabric is endowed with transparent rational beauty.

Attempts have been made to explain away this fact. No one would deny, of course, that evolutionary necessity will have molded our ability for thinking in ways that will ensure its adequacy for understanding the world around us, at least to the extent that is demanded by pressures for survival. Yet our surplus intellectual capacity, enabling us to comprehend the micro world of quarks and gluons and the macro world of big-bang cosmology, is on such a scale that it beggars belief that this is simply a fortunate by-product of the struggle for life.

Even less plausible, in my view, is the claim sometimes advanced that human beings happen to like mathematical reasoning and so they manipulate their account of physical process into pleasing mathematical shapes. Nature is not so plastic as to be subject to our whim in this way. In 1907, Einstein had what he called "*the happiest thought of my life*," when he recognised the principle of equivalence, which implied that all entities would move in the same way in a gravitational field. This universality of effect meant that gravity could be expressed as a property of space-time itself; physics could be turned into geometry.

Einstein then embarked on a search for a beautiful equation that would determine the relevant geometrical structure. It took him eight years to find it, culminating in the discovery of the theory of general relativity in November 1915. It was a truly beautiful theory, but now came the moment of truth. On 18th November, Einstein calculated the prediction made by his theory for the motion of the planet Mercury. He found that it precisely explained a discrepancy in relation to Newton's theory that had baffled astronomers for more than sixty years. Einstein's biographer, Abram Pais, says, "*This discovery was, I believe, by far the strongest emotional experience in Einstein's scientific life, perhaps in all his life. Nature had spoken to him.*"

Whilst the great man himself said, "*For a few days, I was beside myself with joyous excitement.*" It was a great triumph but, if the answer had not come out right, the aesthetic power of the equations of general relativity would have been quite unable in itself to save them

from abandonment. It was indeed *Nature* that had spoken.

There is no a-priori reason why beautiful equations should prove to be the clue to understanding nature; why fundamental physics should be possible; why our minds should have such ready access to the deep structure of the universe. It is a contingent fact that this is true of us and of our world, but it does not seem sufficient simply to regard it as a happy accident. Surely it is a significant insight into the nature of reality.

I believe that Dirac and Einstein, in making their great discoveries, were participating in an encounter with the Divine. It has become common coinage with contemporary writers about science to invoke, in addressing the general public, the idea of a reading of the 'Mind of God.' It is a small, but significant, sign of the human longing for God that apparently this language helps to sell books.

There is much more to the mind of God than physics will ever disclose, but this usage is not misleading, for I believe that the rational beauty of the cosmos indeed reflects the Mind that holds it in being. The "unreasonable effectiveness of mathematics" in uncovering the structure of the physical world (to use Eugene Wigner's pregnant phrase) is a hint of the presence of the Creator, given to us creatures who are made in the divine image.

I do not present this conclusion as a logical demonstration -- we are in a realm of metaphysical discourse where such certainty is not available either to believer or to unbeliever -- but I do present it as a coherent and intellectually satisfying understanding.

How has Religion treated science and scientists? Not always very well! Galileo is probably the most striking example of the religio/political victim.

Galileo, perhaps more than any other single person, was responsible for the birth of modern science. His renowned conflict with the Catholic Church was central to his philosophy, for Galileo was one of the first to argue that man could hope to understand how the world works, and, moreover, that we could do this by observing the real world.

Galileo had believed Copernican theory (that the planets orbited the sun) since early on, but it was only when he found the evidence needed to support the idea that he started to publicly support it. He wrote about Copernicus' theory in Italian (not the usual academic Latin), and soon his views became widely supported outside the universities. This annoyed the Aristotelian professors, who united against him, seeking to persuade the Catholic Church to ban Copernicanism.

Galileo, worried by this, travelled to Rome to speak to the ecclesiastical authorities. He argued that the Bible was not intended to tell us anything about scientific theories, and that it was usual to assume that, where the Bible conflicted with common sense, it was being allegorical. But the Church was afraid of a scandal that might undermine its fight against Protestantism, and so took repressive measures. It declared Copernicanism "false and erroneous" in 1616, and commanded Galileo never again to "defend or hold" the doctrine. Galileo acquiesced.

In 1623, a longtime friend of Galileo's became the Pope. Immediately Galileo tried to get the 1616 decree revoked. He failed, but he did manage to get permission to write a book

discussing both Aristotelian and Copernican theories, on two conditions: he would not take sides and would come to the conclusion that man could in any case not determine how the world worked because God could bring about the same effects in ways unimagined by man, who could not place restrictions on God's omnipotence.

The book, *Dialogue Concerning the Two Chief World Systems*, was completed and published in 1632, with the full backing of the censors--and was immediately greeted throughout Europe as a literary and philosophical masterpiece. Soon the Pope, realizing that people were seeing the book as a convincing argument in favour of Copernicanism, regretted having allowed its publication. The Pope argued that although the book had the official blessing of the censors, Galileo had nevertheless contravened the 1616 decree. He brought Galileo before the Inquisition, who sentenced him to house arrest for life and commanded him to publicly renounce Copernicanism. For a second time, Galileo acquiesced.

Galileo remained a faithful Catholic, but his belief in the independence of science had not been crushed. Four years before his death in 1642, while he was still under house arrest, the manuscript of his second major book was smuggled to a publisher in Holland. It was this work, referred to as *Two New Sciences*, even more than his support for Copernicus that was to be the genesis of modern physics.

After consideration of these examples of the science/religion Interface, I believe that it can be seen that science is not a cold, calculated, soul-less activity, but a joyous pursuit of minute discoveries which millimetre by millimetre, show mankind more glories of God's incredible universe.

Einstein provides a compelling truism about the science-religion relationship.

***"Science without religion is lame,
Religion without science is blind."***

All I can add to that is ***AMEN!***

Philip Fitzherbert, January 2022